United States Patent [19]

Yoshida

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[45] **Date of Patent: Apr. 8, 1986**

[54] **SCALE BALANCING DEVICE IN UNIVERSAL PARALLEL RULER DEVICE**

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[22] Filed: **Jan. 9, 1985**

[51] **Int. Cl.**[4] **B43L 13/02**

[52] **U.S. Cl.** **33/438;** 33/439; 33/440

[58] **Field of Search** 33/438, 430, 439, 440, 33/448

[56] **References Cited**

U.S. PATENT DOCUMENTS

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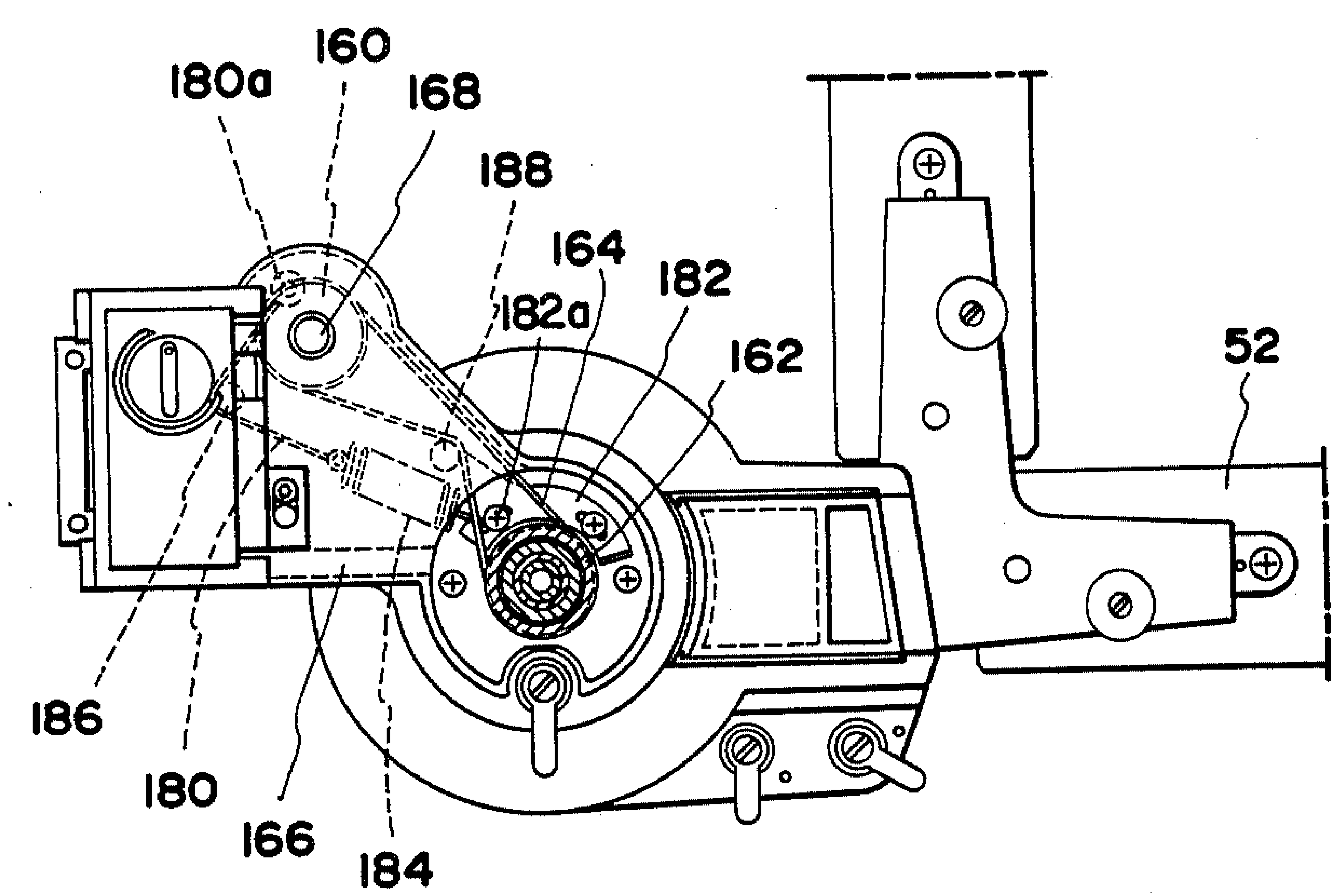
Primary Examiner—Willis Little

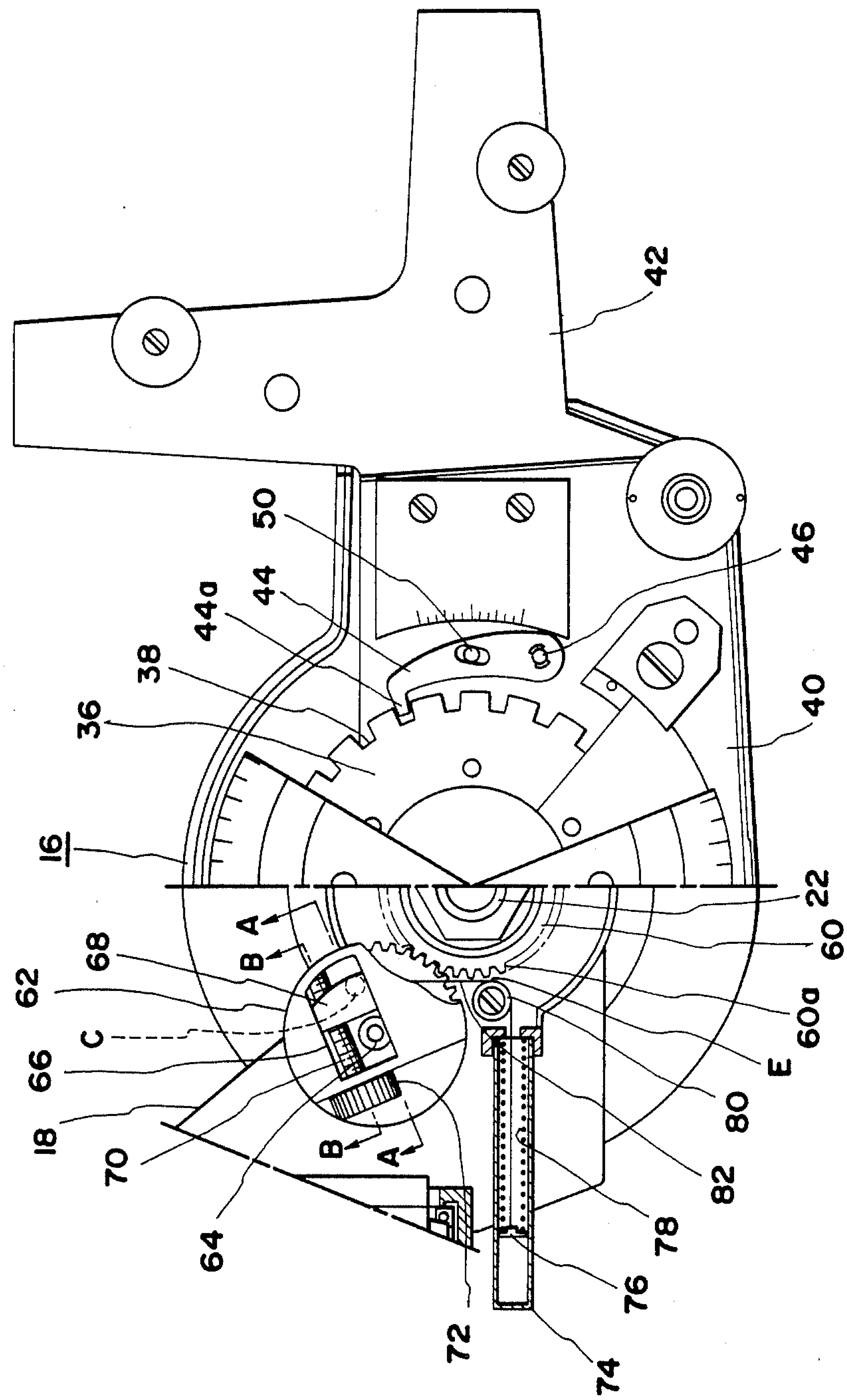
Attorney, Agent, or Firm—Wenderoth, Lind & Ponack

[57] **ABSTRACT**

A scale balancing device for balancing the weight of a scale of a universal parallel ruler, having a head structure having a rotating scale support rotatably mounted thereon on which the scales are carried, the scale support and scales having a center of gravity when the scale is horizontal spaced horizontally from the axis of rotation of the scale support, a rotating member rotatably mounted on the head structure separate from the rotating support, the rotating member and the scale support being rotatably interlocked, an eccentric member on the rotating member, a spring member having one end connected to the eccentric member and the other end connected to the head structure and tensioned for providing a torque on the rotating member in a direction which substantially cancels out the torque on the rotating member from the weight of the scales, the point of interlocking of the rotating member and the scale support being on the side of the scale support toward the center of gravity when the scale is in the horizontal position for causing the point of action of the torque from the rotating member to act upwardly at a point toward the center of gravity from the axis of rotation of the scale support.

3 Claims, 19 Drawing Figures





16
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44a
46
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A
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FIG. 1

FIG. 2

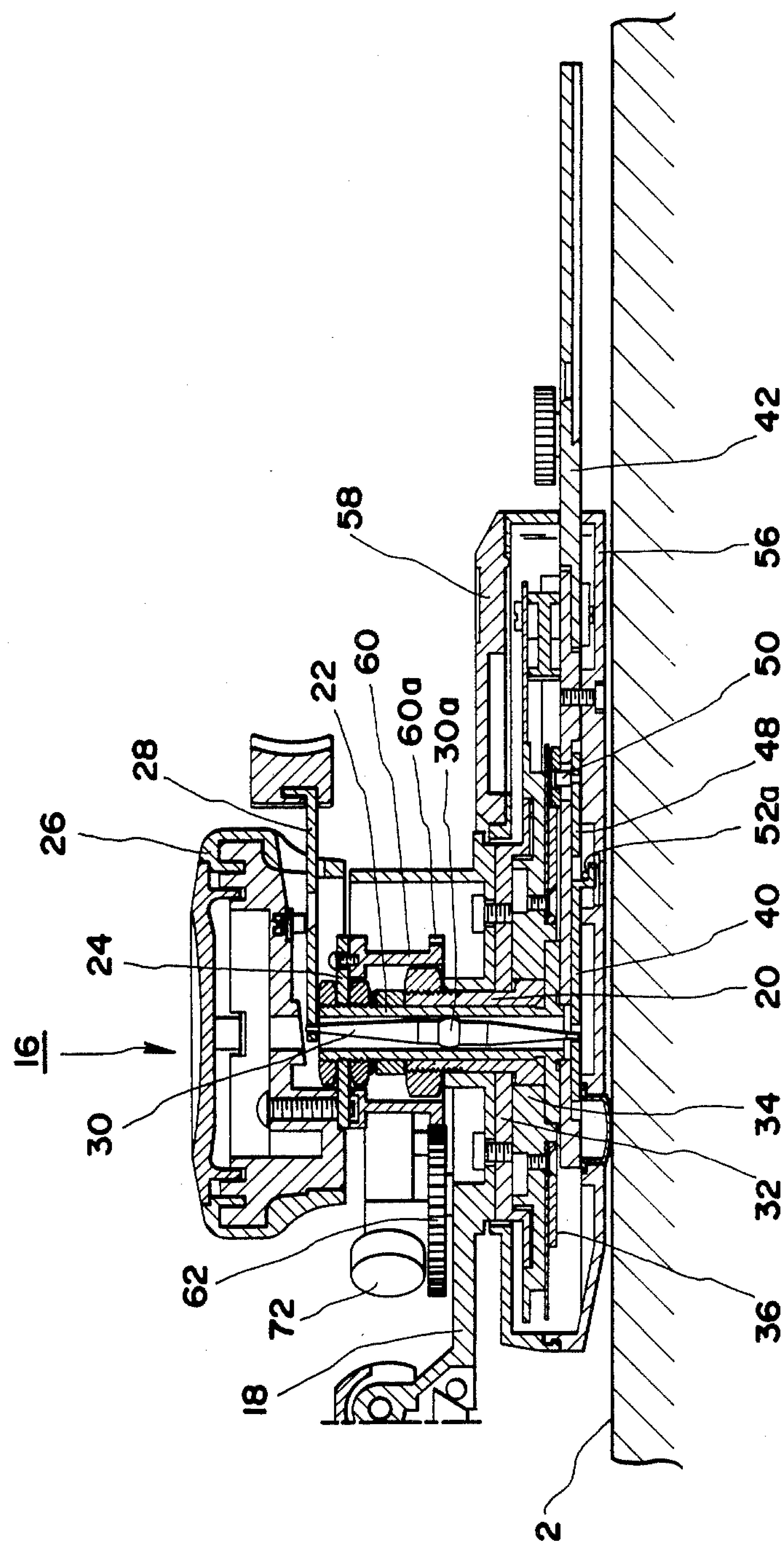
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FIG. 3

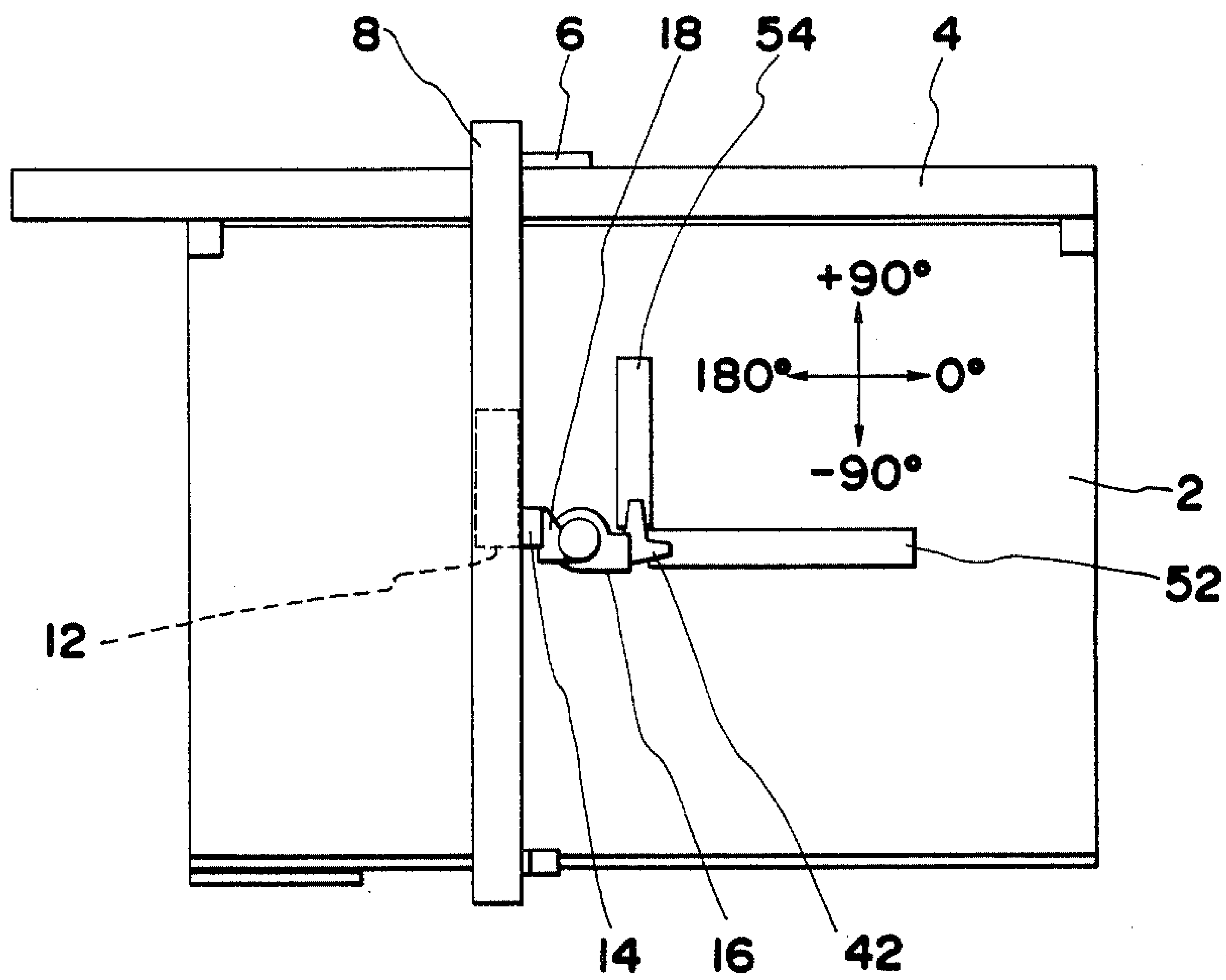


FIG. 4

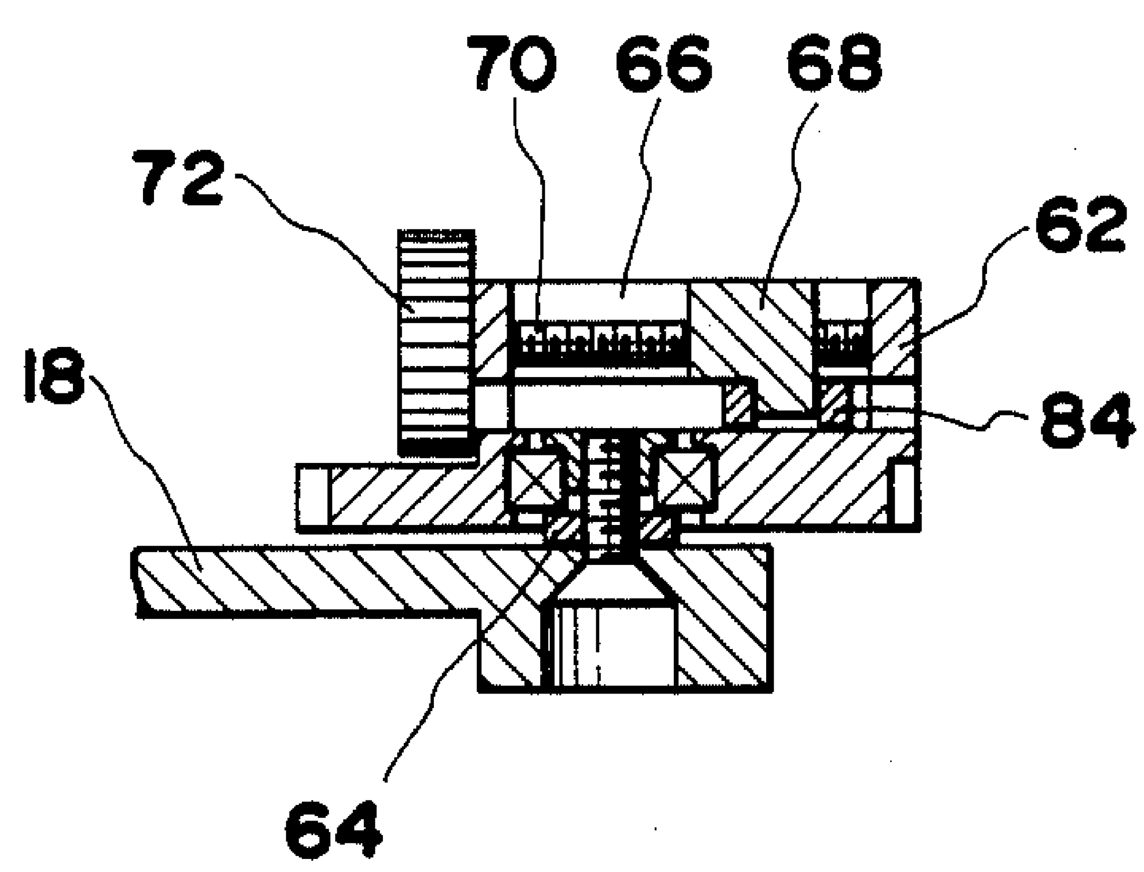


FIG. 5

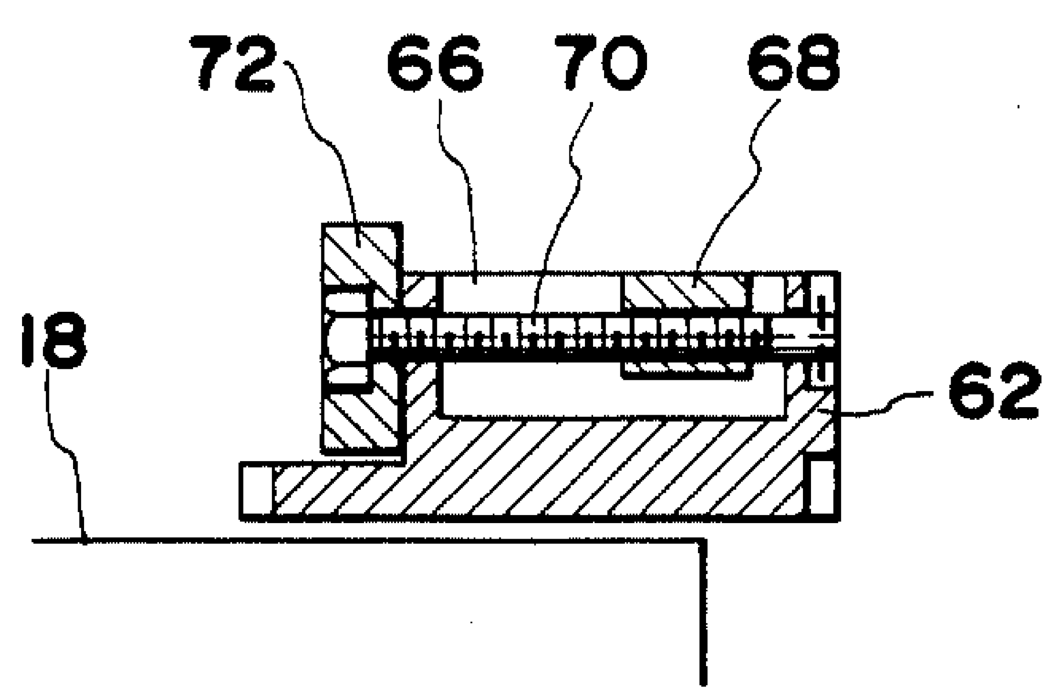
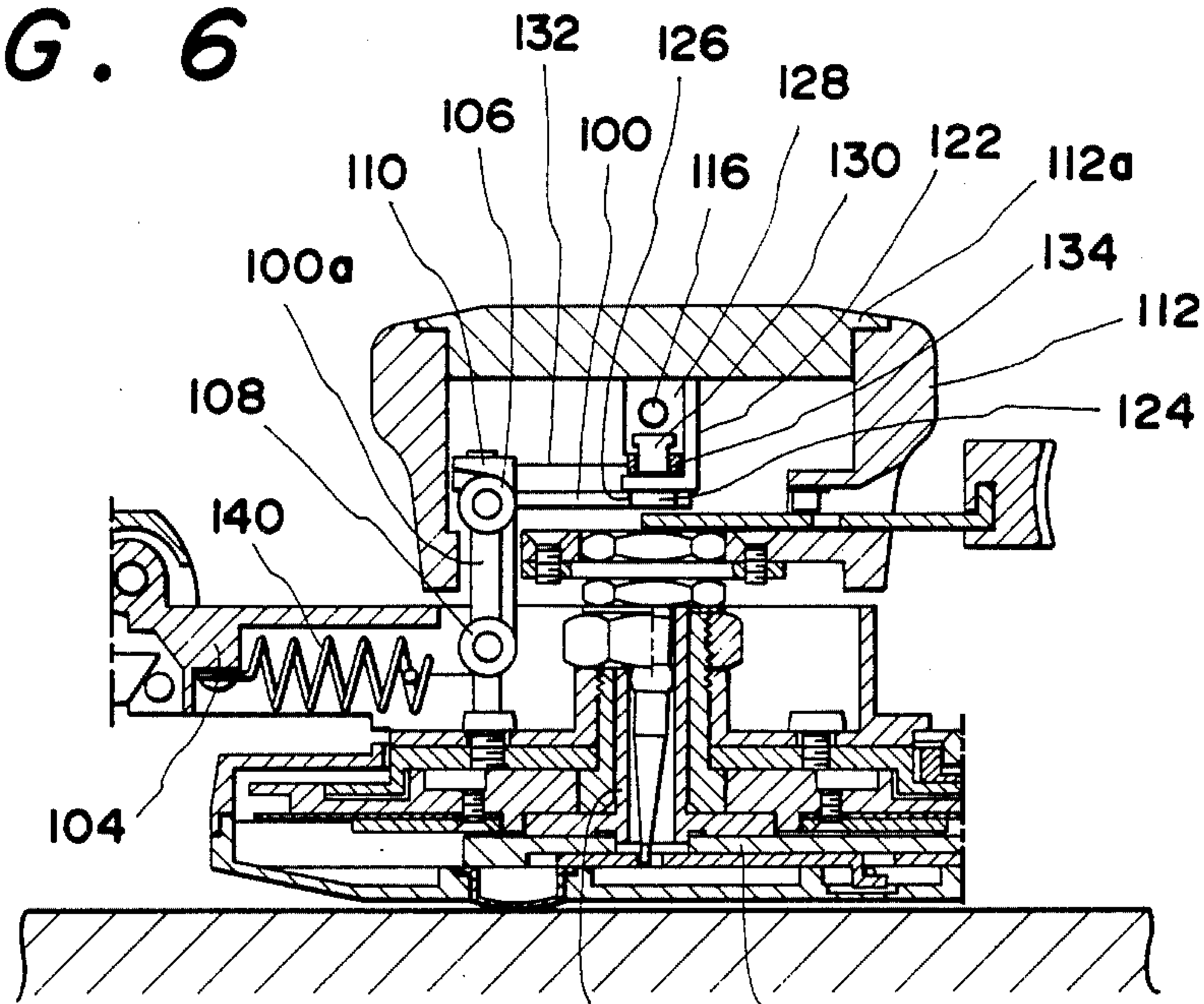


FIG. 6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112a
100a
134
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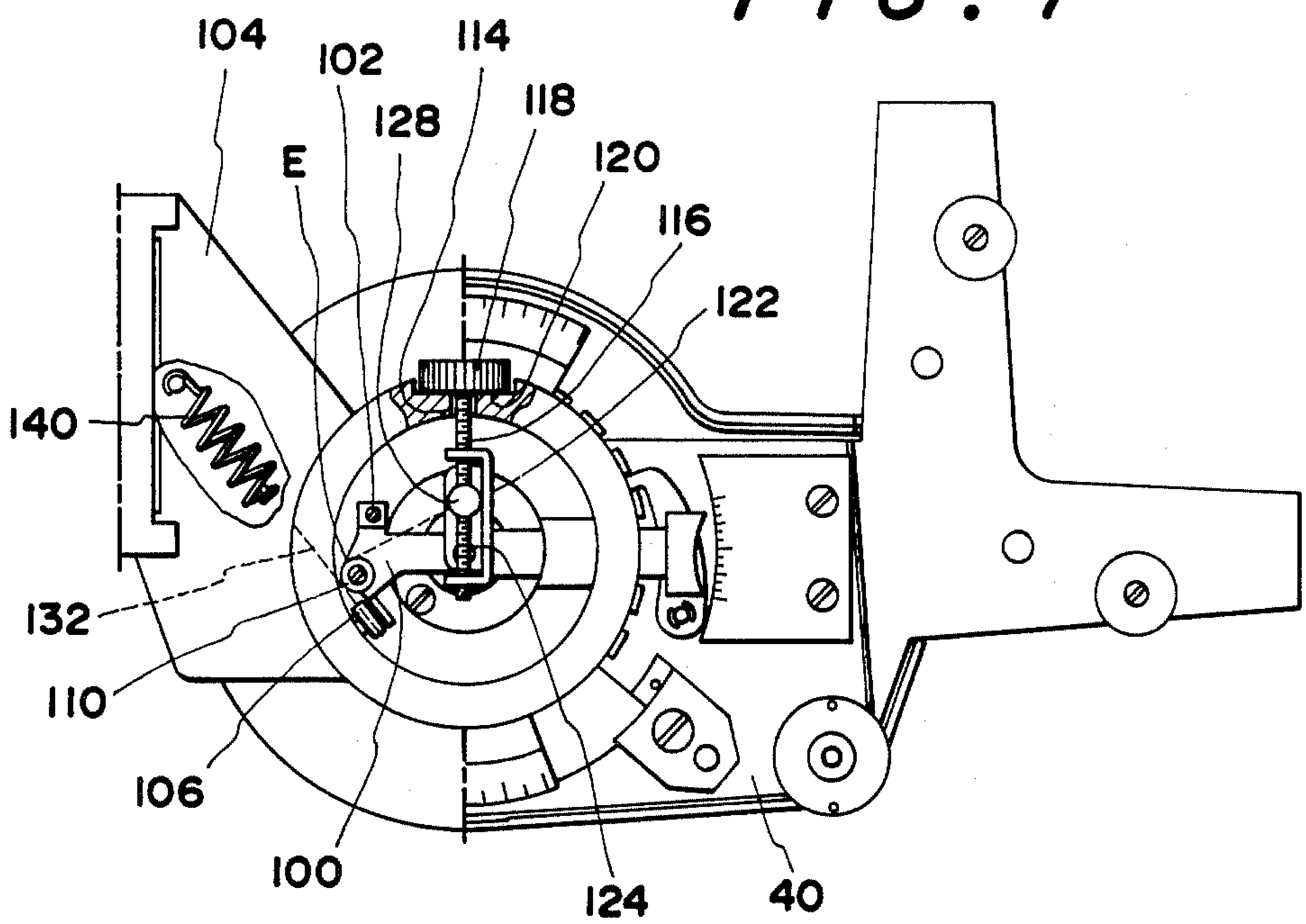
124
140
104
22
40

FIG. 7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114
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100
124
40

FIG. 8

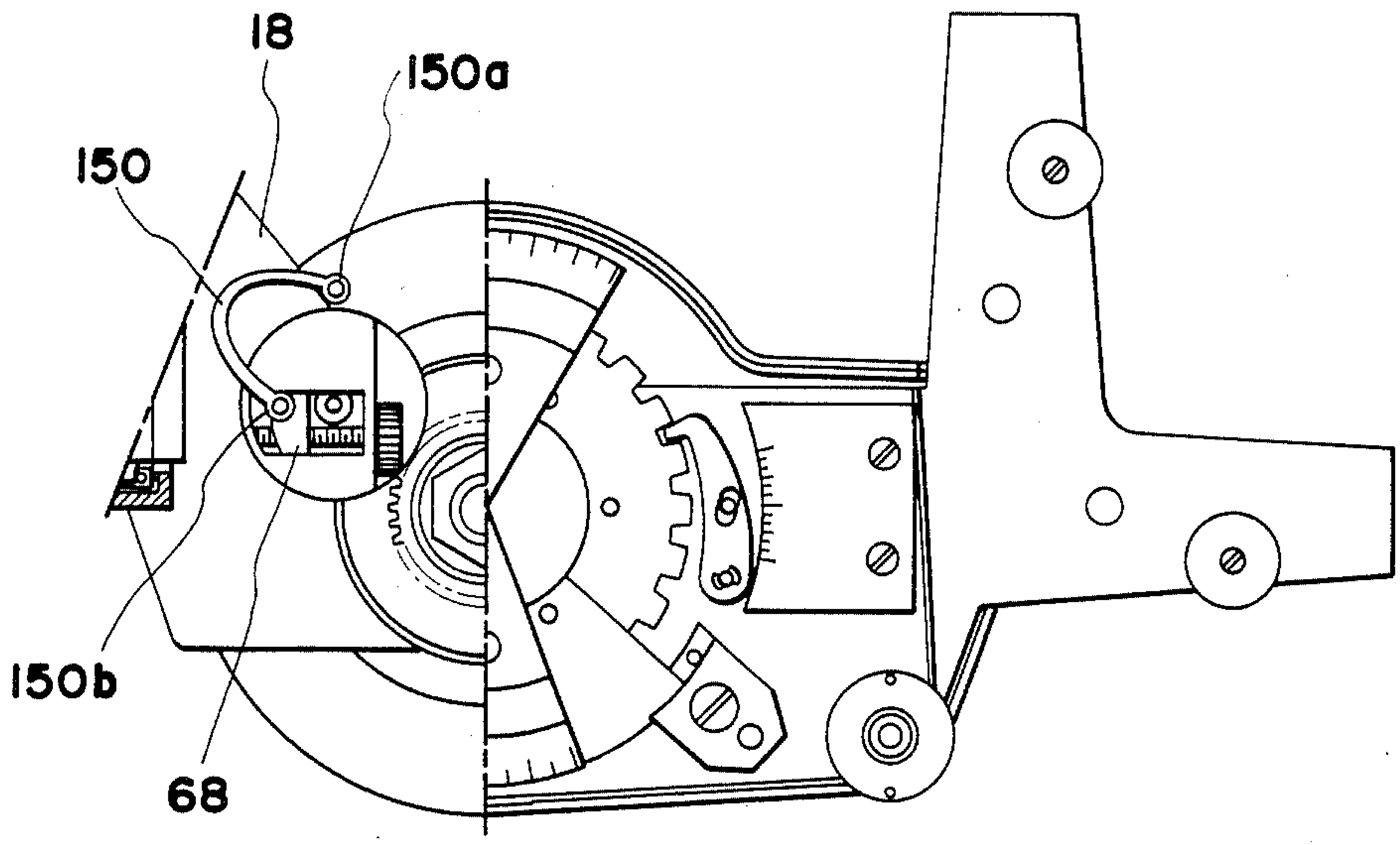


FIG. 9

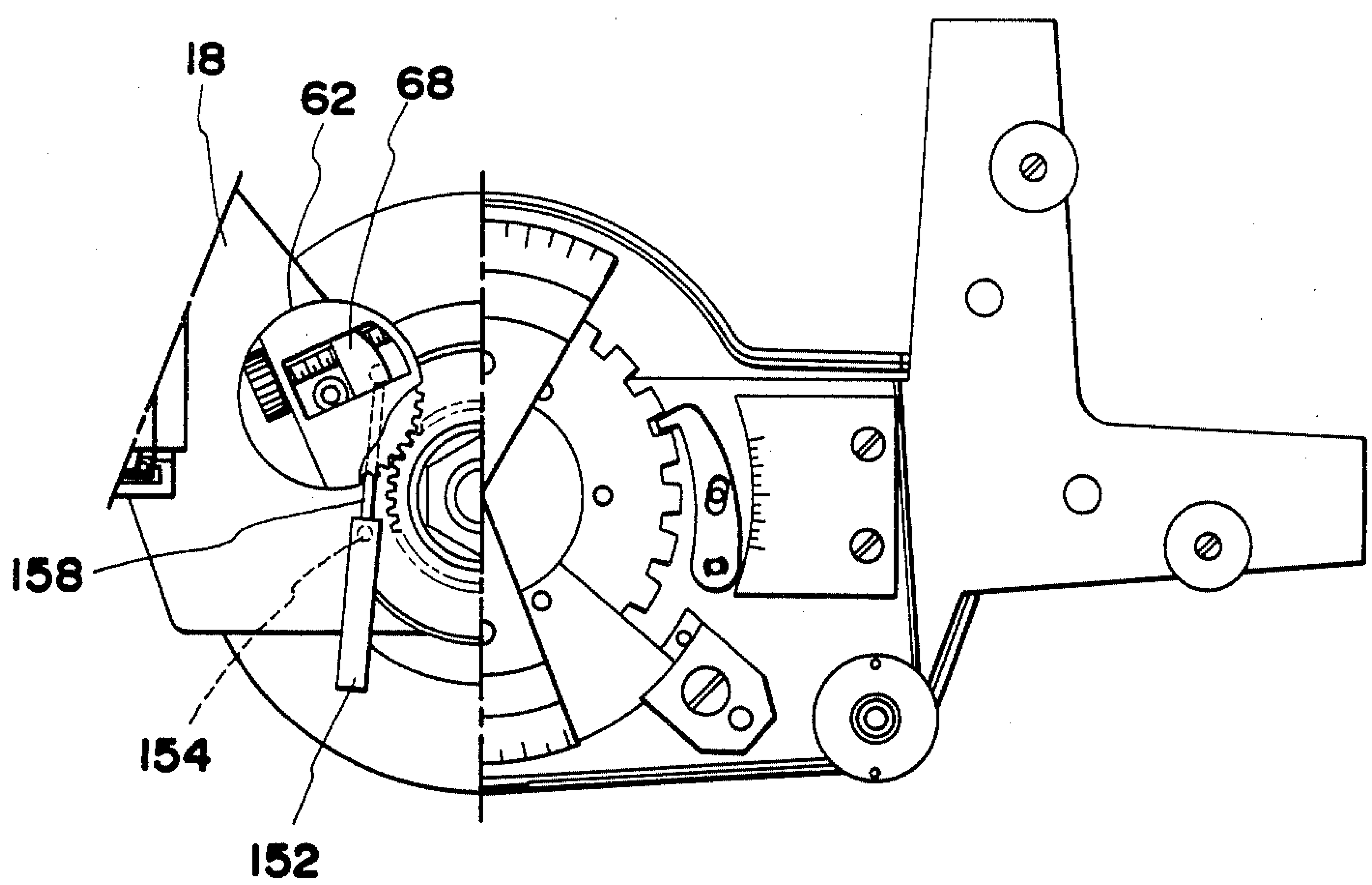


FIG. 10

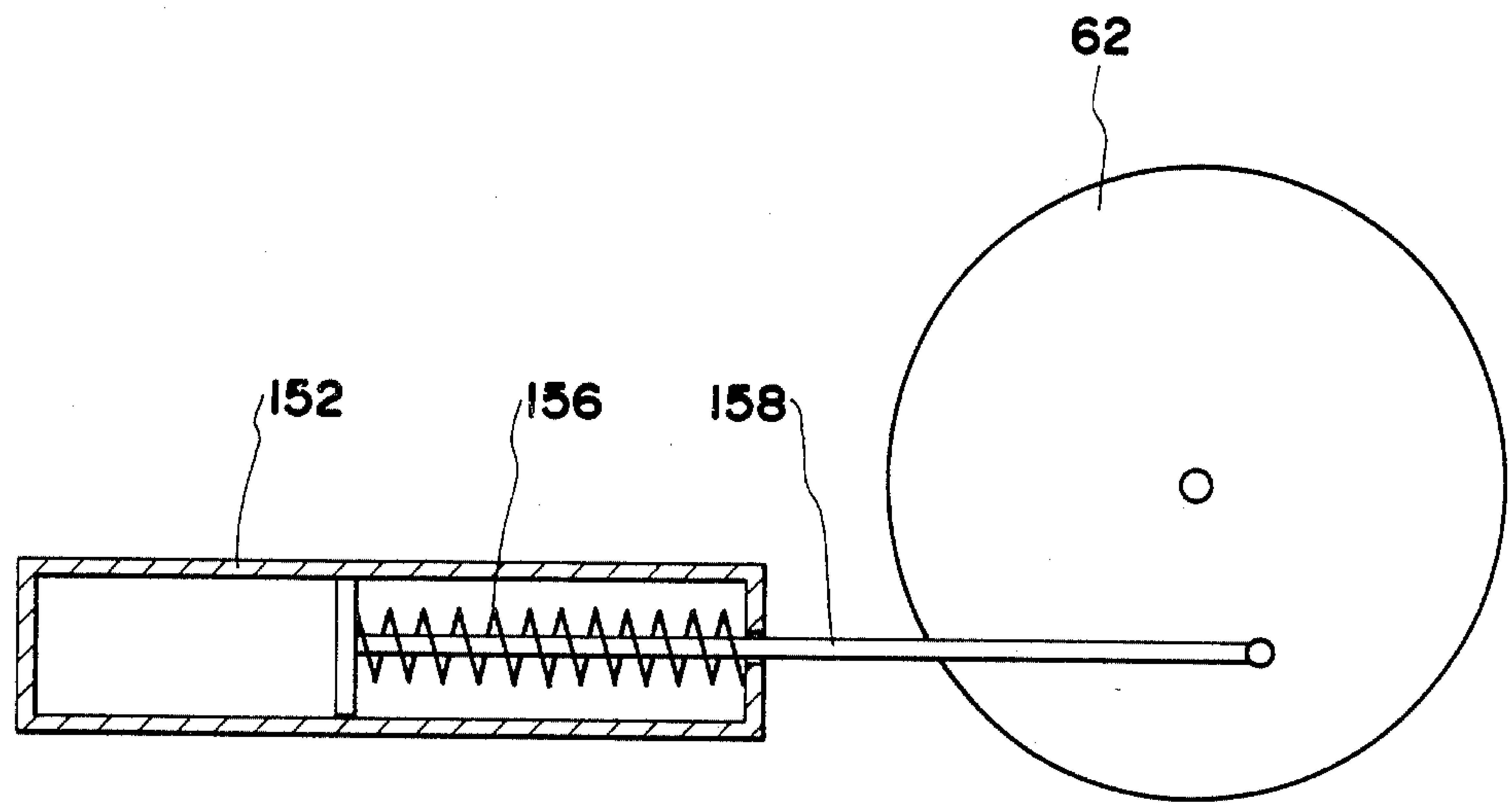


FIG. 11

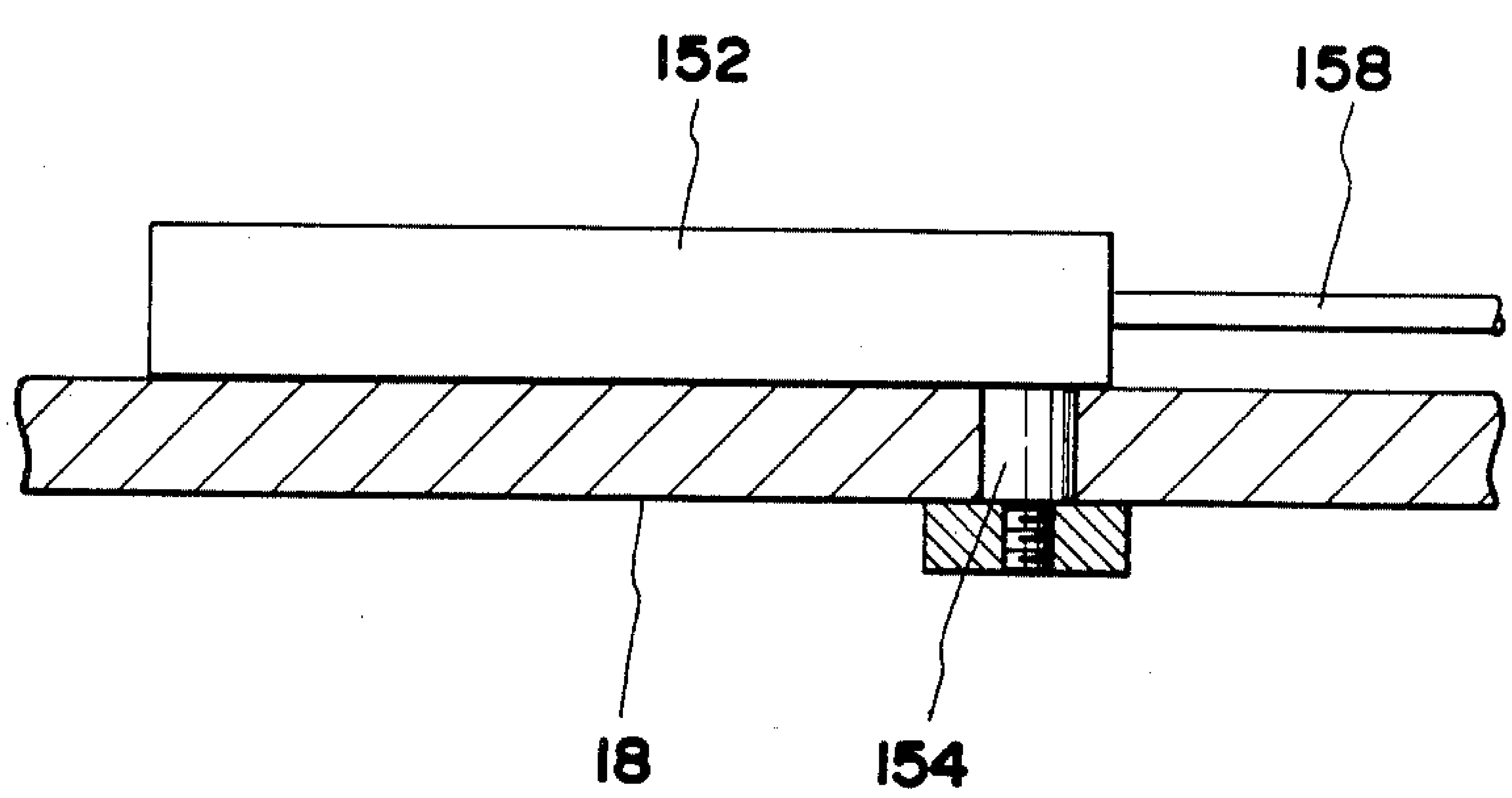


FIG. 12

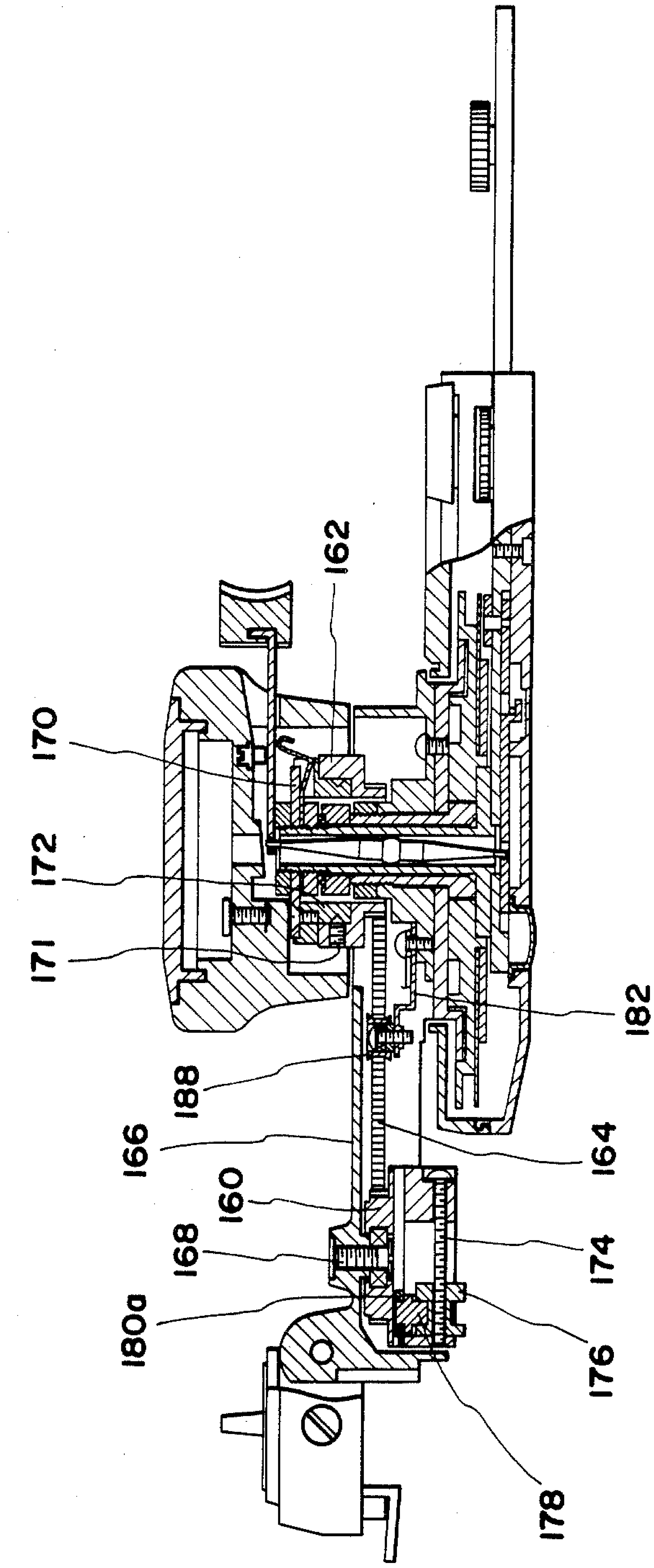


FIG. 13

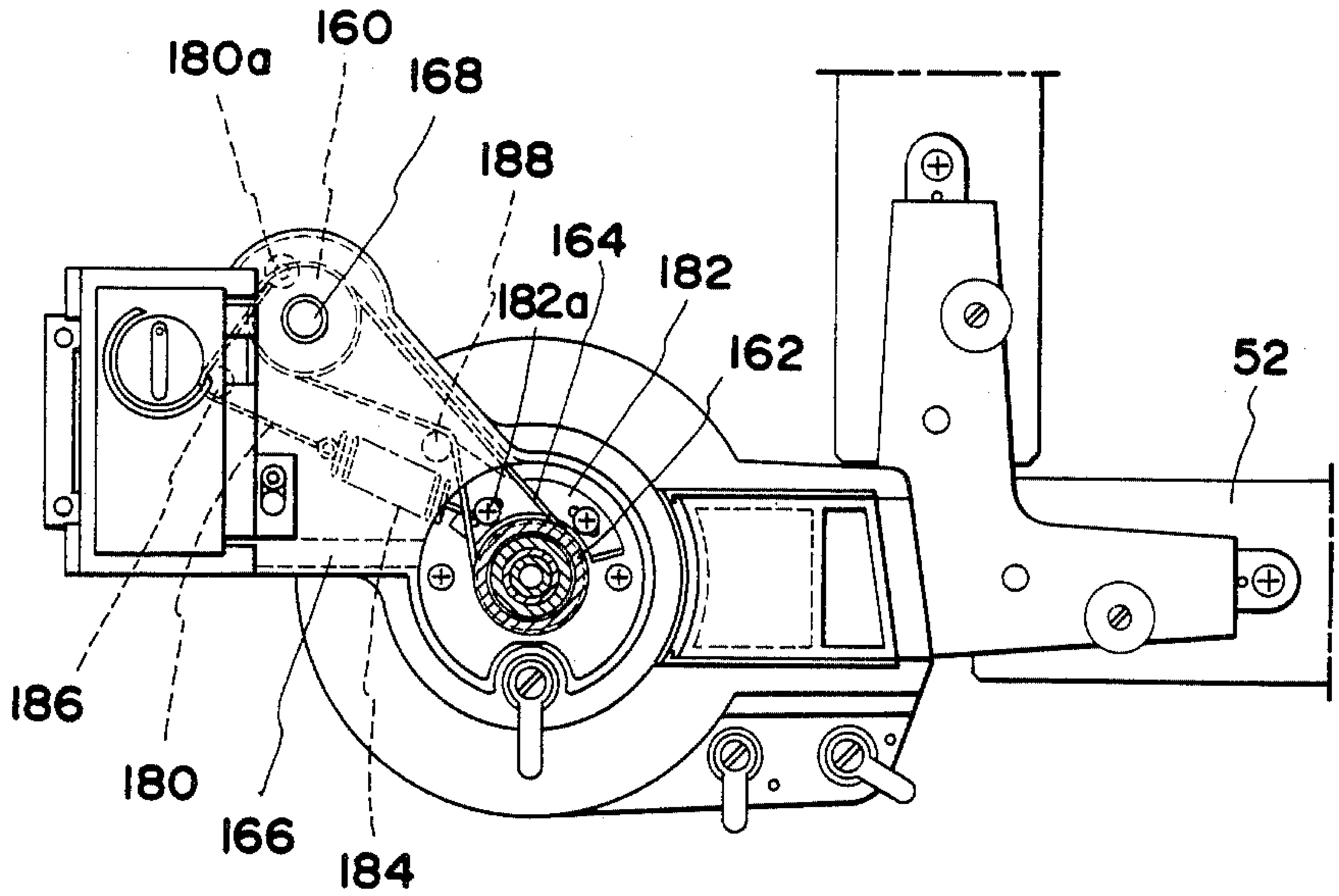

160
180a
168
188
164
182a
182
162
52
186
180
166
184

FIG. 14

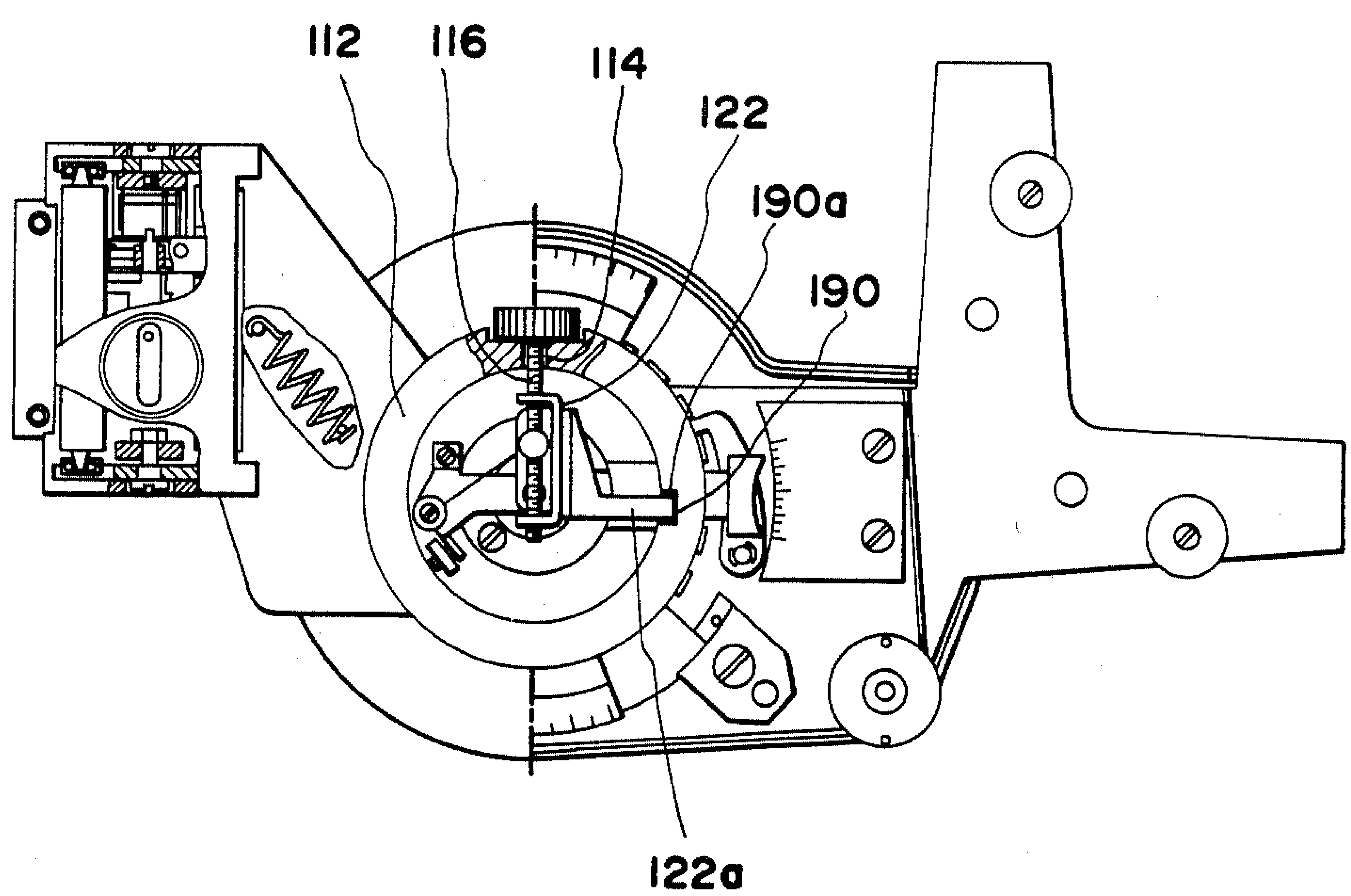

112
116
114
122
190a
190
122a

FIG. 15

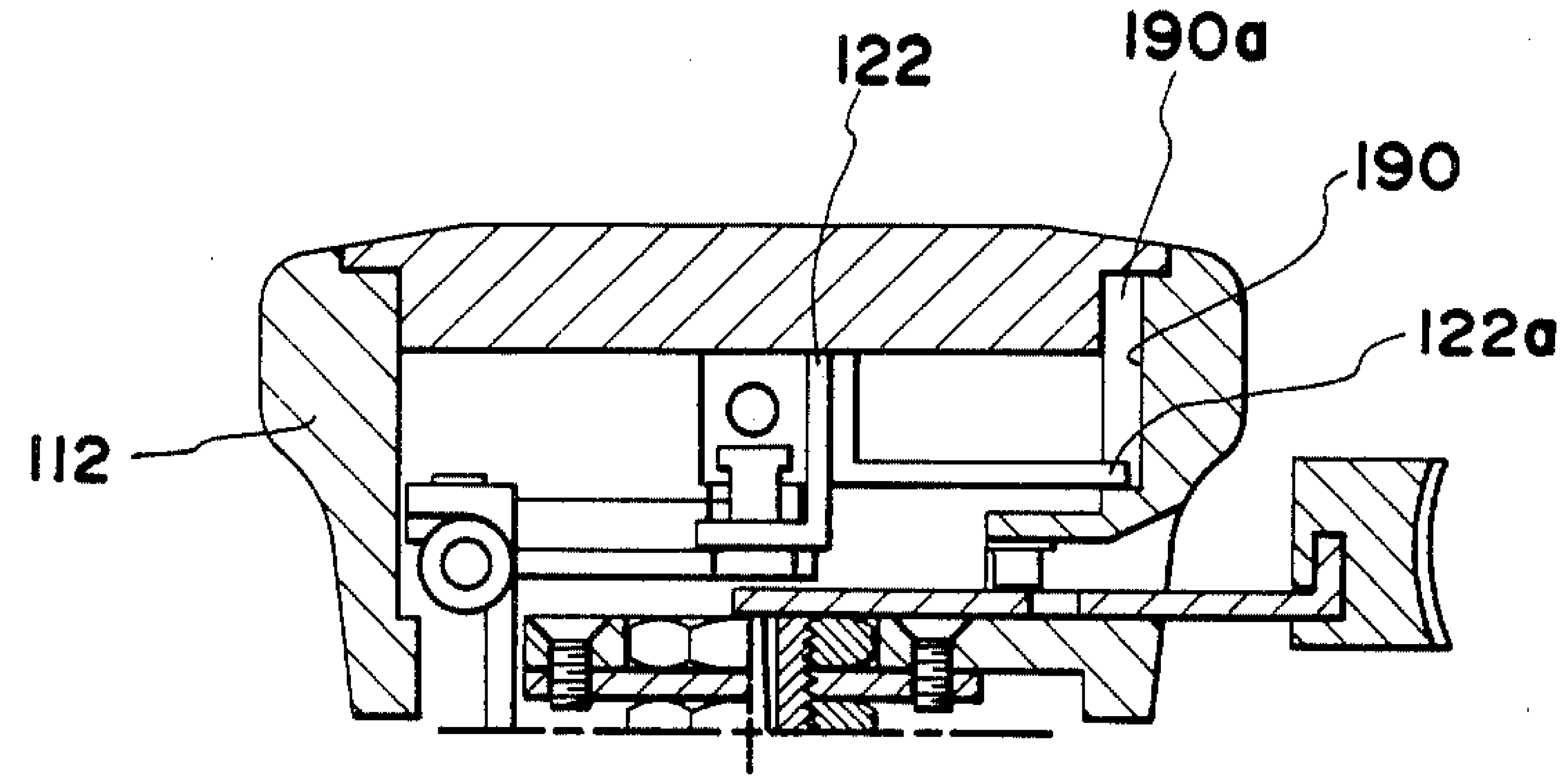


FIG. 16

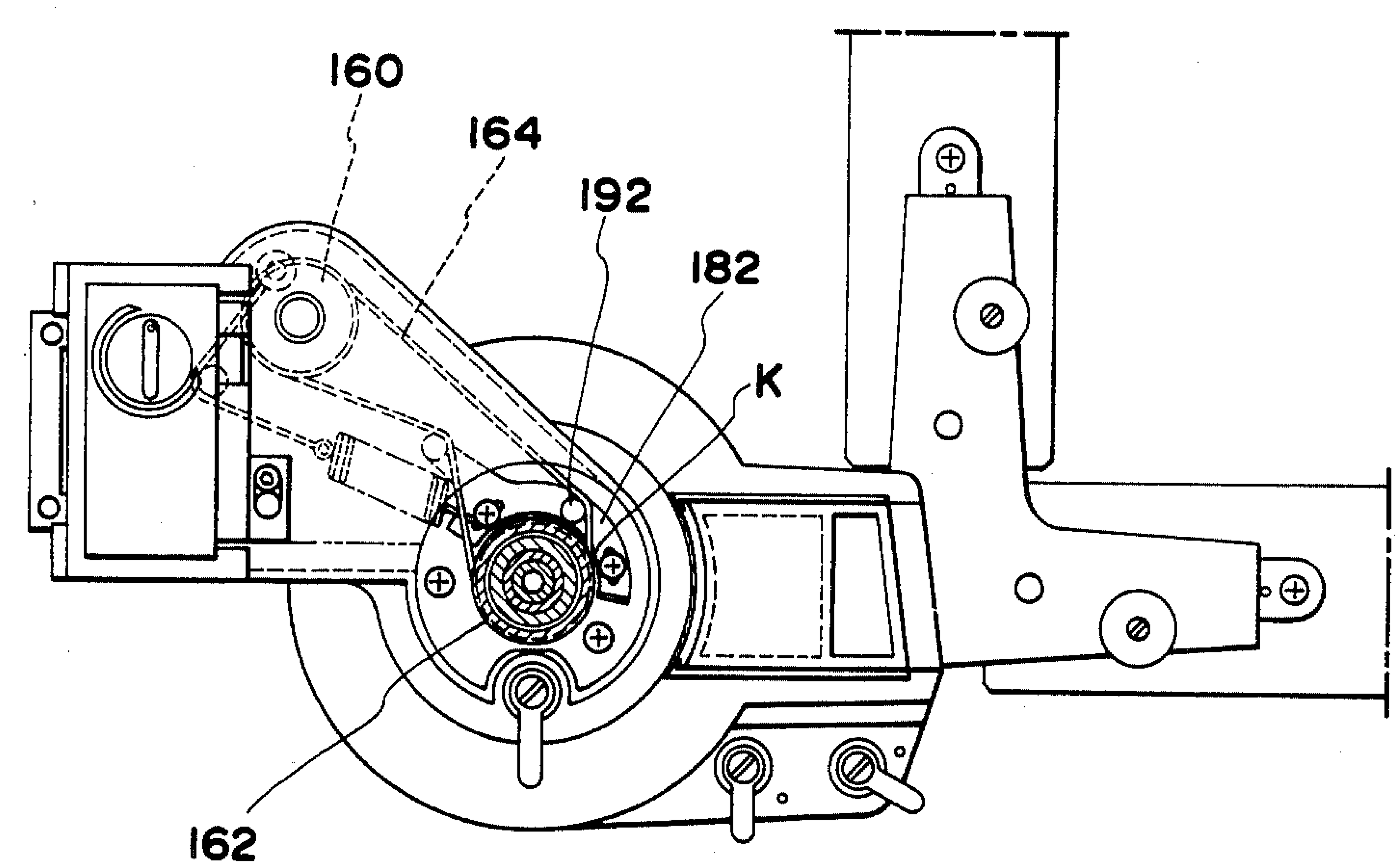


FIG. 17

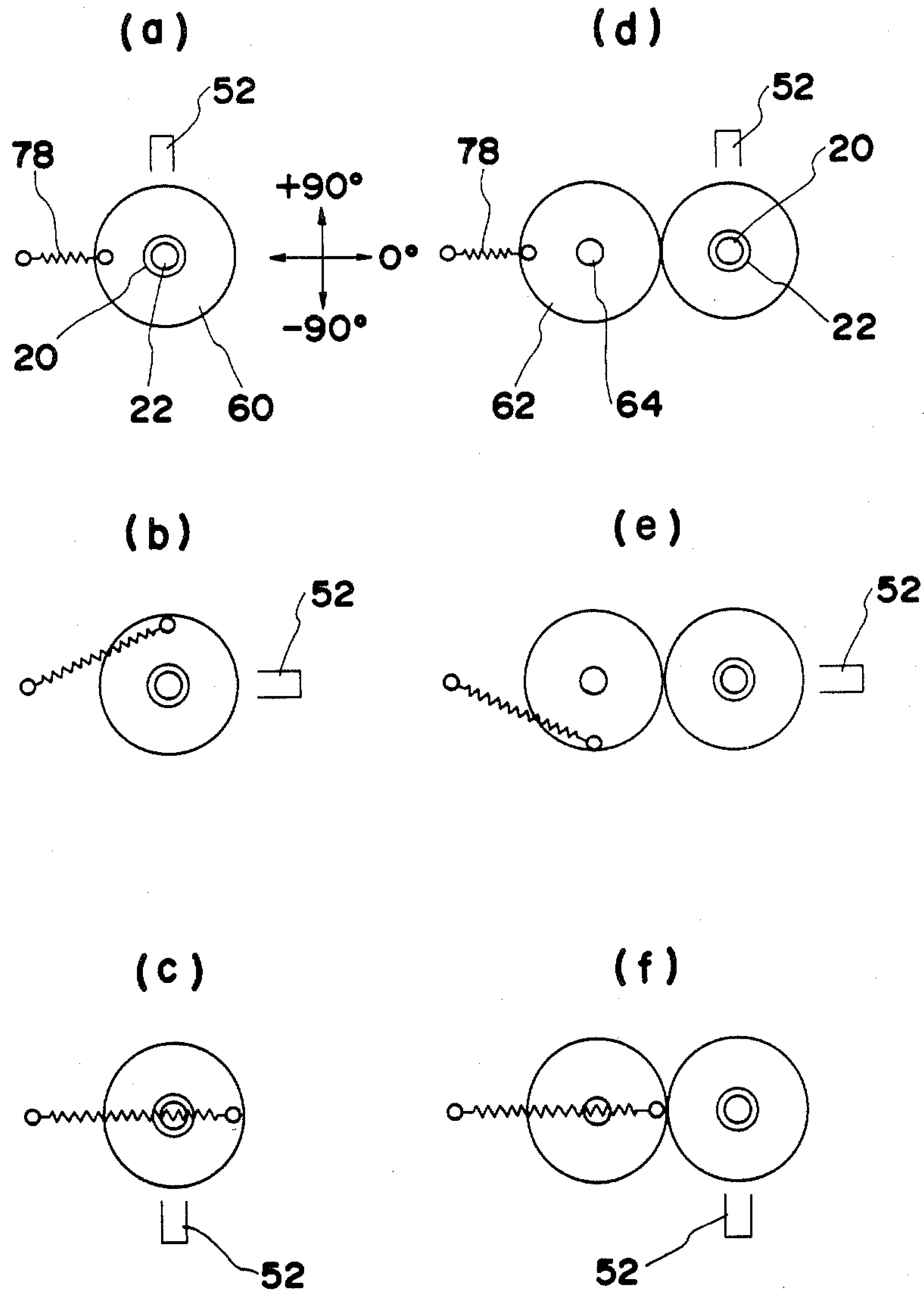


FIG. 17(a)

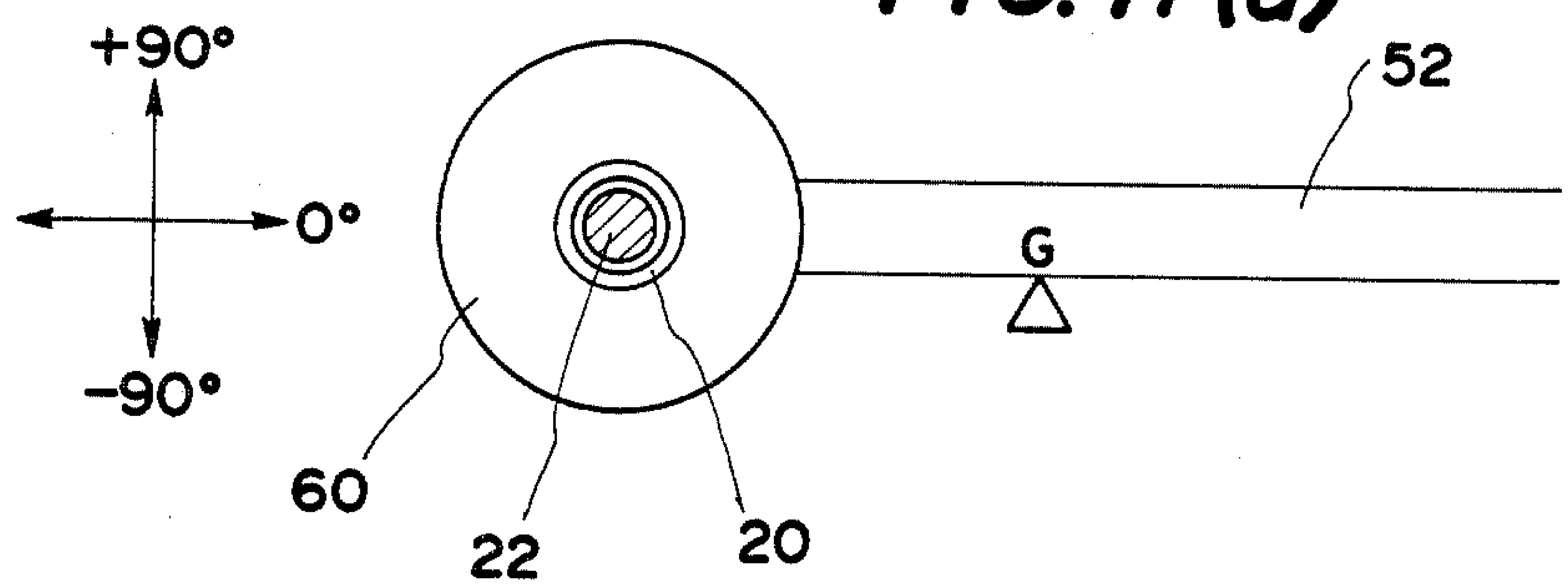


FIG. 17(b)

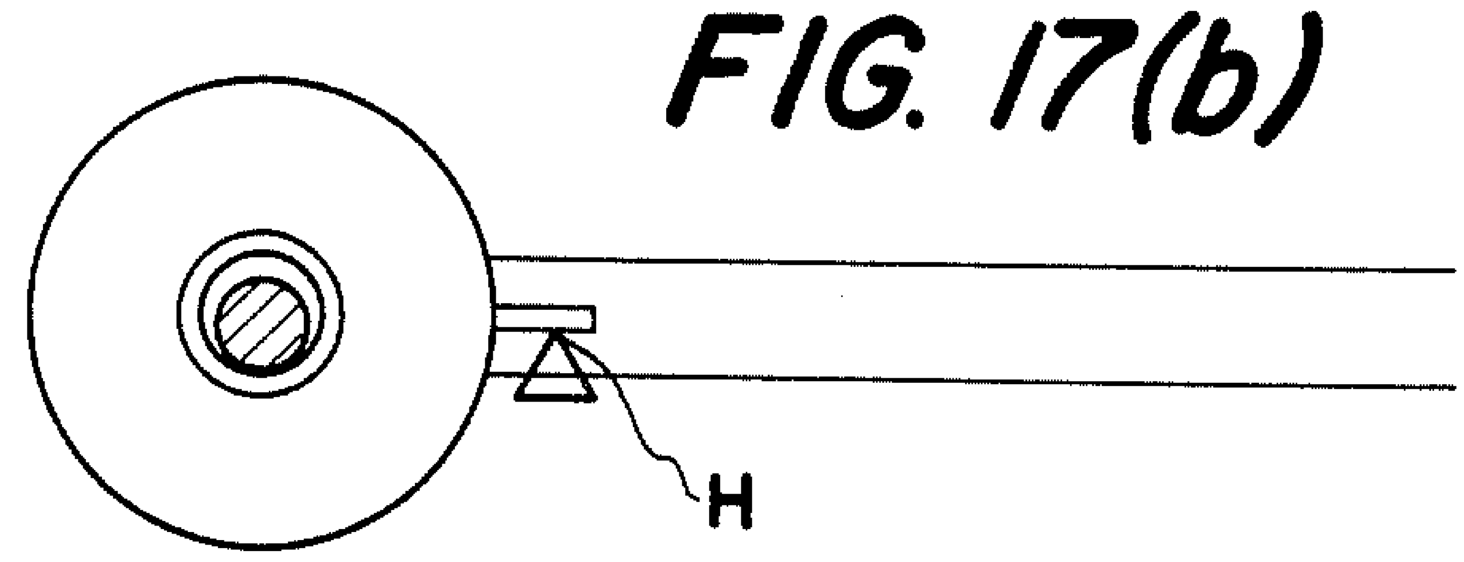
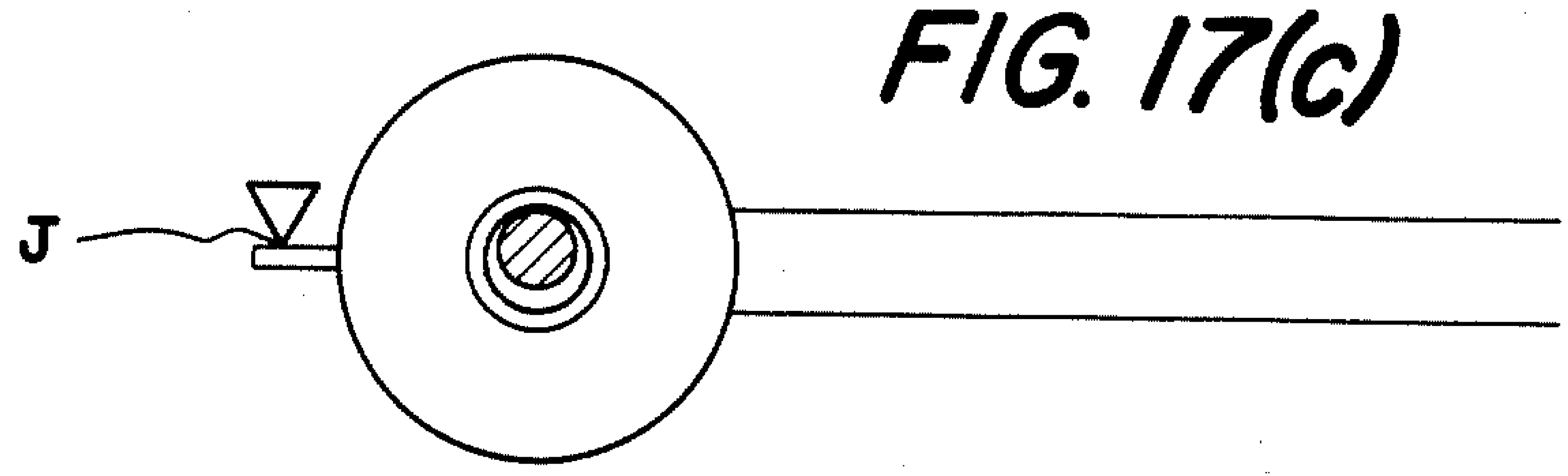


FIG. 17(c)



SCALE BALANCING DEVICE IN UNIVERSAL PARALLEL RULER DEVICE

BRIEF SUMMARY OF THE INVENTION

This invention relates to a scale balancing device in universal parallel ruler device wherein a scale is caused to be set in a freely rotatable condition relative to a non-rotating member of a head on an inclinable drawing board whereby the scale is not rapidly rotated in a downward direction due to an inclination of the drawing board to maintain the scale in a stable and static condition.

Scale balancing devices in a universal parallel ruler device are available in various types, but the devices are classified roughly into a balance weight system and an eccentric cam system. The balance weight system is one in which the weight of a balance weight is caused to work in a direction opposite to the rotating direction on a member interlocked with the rotation of a scale in a downward dropping direction to balance the scale by the action of the weight. A balancing device of this type is disclosed in the publications, for example, the Japanese Utility Model Publication No. 47-9478, Japanese Patent Publication No. 57-47040, Japanese Patent Publication No. 57-49399 and Japanese Patent Publication No. 58-4640. On the other hand, the eccentric cam system is one in which a spring is caused to work on an eccentric cam interlocked within the rotation of a scale, and a rotatory torque is generated on the eccentric cam by the elastic force of the spring in a direction opposite to the rotating direction of the scale due to the weight of the scale to balance the scale. A balancing device of the eccentric cam system type is disclosed in the Japanese Utility Model Publication No. 52-28605.

The balancing weight system has a drawback, for example, that the weight becomes heavy due to the use of the balance weight and also the manual rotation of the scale by the inertia force of the balance weight becomes difficult. The eccentric cam system has a drawback, for example, the frictional force is generated on an elastic contact portion of the spring and the eccentric cam whereby the manual rotation of the scale by the frictional force becomes difficult.

A primary object of this invention is to provide a scale balancing device which does not use a balance weight and an eccentric cam, and the scale is maintained in a balanced condition by connecting a spring member to a rotating member that rotates by interlocking with the scale, whereby the scale can be rotated by a light manual operation.

Another object of this invention will be described in the following by referring to FIG. 17.

When the drawing board is tilted in a vertical direction, the rotatory torque in clockwise direction centering around the tubular member **20** rotatably mounted on a spindle **22** is generated by the total weight of the rotating member **60** and the scale **52** connected to the rotating member **60** acting on the spindle **22** to which the rotating member **60** is fixed. This rotatory torque becomes a maximum condition when the scale **52** is in the zero degree position. If the rotating member **60** is balanced by canceling this rotatory torque out, the load working between the spindle **22** and the tubular member **20** becomes zero if the center of gravity G of the overall structure and which is to the side of the rotating member **60** is supported. However, as a practical problem, the supporting of the position of center of gravity to the side of the rotating member **60** is difficult from a design standpoint. Under this circumstance, if a position in the vicinity of the point of center of gravity on the outer periphery of the rotating member **60**, for example, a point is supported, the pressure load between the spindle **22** and the tubular member **20** can be decreased. As shown in FIG. **17***c*, if a point J is supported which is at a position the most remote from the center of gravity G on the outer periphery of the rotating member **60**, a large load acts between the spindle **22** and the tubular member **20** due to the rotatory torque on the rotating member **60**.

An object of this invention is to decrease the pressure load between the spindle and the tubular member by placing an engaging point of a second rotating member with the rotating member **60** at a position in the vicinity of the point of center of gravity to the side of the rotating member.

DESCRIPTION OF THE FIGURES

FIG. **1** is a plan view of an embodiment of a scale balancing device with the cover of a head removed;

FIG. **2** is a cross section of the head of the embodiment of FIG. **1**;

FIG. **3** is an elevation of an entire universal parallel ruler device;

FIG. **4** is a cross section taken on line A—A in FIG. **1**;

FIG. **5** is a cross section taken on line B—B in FIG. **1**;

FIG. **6** is a cross section of a head illustrating a second embodiment of a scale balancing device;

FIG. **7** is a plan view of the head shown in FIG. **6**;

FIG. **8** is a plan view of the head of a third embodiment of a scale balancing device;

FIG. **9** is a plan view of the head of a fourth embodiment of a scale balancing device;

FIG. **10** is an explanatory drawing of a part of the fourth embodiment;

FIG. **11** is an elevation view of the part shown in FIG. **10**;

FIG. **12** is a cross section of a head according to a first embodiment of this invention;

FIG. **13** is a plan view, partly in cross section, of the head of FIG. **12**;

FIG. **14** is a plan view, partly in cross section, of a head according to a further embodiment of this invention;

FIG. **15** is a cross section of an essential part of the head of FIG. **14**;

FIG. **16** is a plan view, partly in cross section, of a head according to a still further embodiment of this invention; and

FIGS. **17***a*–**17***c* are explanatory drawings explaining the principle of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The construction of this invention will be described in detail in the following by referring to an embodiments illustrated in the attached drawings.

In FIG. **3**, numeral **2** denotes the drawing board, which is supported on a support frame of a drawing stand (not shown) capable of being tilted and fixed at any desired angle. Numeral **4** denotes a horizontal rail disposed on the upper side of the drawing board **2**, and a horizontal cursor **6** is shiftably mounted on the horizontal rail **4**. The upper end of a vertical rail **8** is connected to the horizontal cursor **6**. The lower end of the vertical rail **8** is shiftably mounted on the drawing board **2** by means of a tail portion roller (not shown). Numeral **12** denotes a vertical cursor mounted shiftably on the vertical rail **8**, and the vertical cursor has mounted thereon to a support base plate **18** of a head **16**, namely, a non-rotating member by means of a known double hinge mechanism **14**. As shown in FIG. **2**, the tubular member **20** is fixed to a tubular portion of the support base plate **18** by means of nut. Numeral **22** denotes a tubular spindle, and the outer peripheral surface of the spindle is rotatably inserted into the interior of the tubular member **20** in engagement with the inner peripheral surface thereof, and a mounting plate **24** is fixed to an upper portion of the spindle **22** by means of nut. A grip handle **26** is fixed to the mounting plate **24**. Numeral **28** denotes an index lever, and its one end portion is connected to the upper end of a conical bar **30** disposed in the interior of the spindle **22**. Numeral **32** denotes a stationary board fixed to the support base plate **18**, and numeral **34** denotes a protractor rotatably fitted to an outer peripheral surface of a flange portion of the tubular member **20**, and the protractor **34** is fixed to the stationary board **32** by means of a stationary mechanism (not shown) capable of being released. Numeral **36** denotes an index ring fixed to the protractor **34**, and concave index recesses **38** are formed in the outer peripheral surface of the index ring **36** at predetermined intervals. Numeral **40** denotes a base plate fixed to the flange portion of the spindle **22**, and a scale mounting plate **42** is mounted on the base plate **40**. Numeral **44** denotes a swing arm whose one end portion is pivotally supported on the base plate **40** by means of a shaft **46**, and a pawl portion **44***a* of the swing arm **44** is fitted into one of the index recesses **38** (refer to FIG. **1**). One end of a transmitting member **48** is connected to the lower end of the conical bar **30**, and a shaft **50** fixed to the other end of the transmitting member **48** is fitted in a long groove formed in the swing arm **44**. The transmitting member **48** is urged in a leftward direction in FIG. **2** by means of a spring member **52***a*. The index lever **28**, conical bar **30**, index ring **36**, swing arm **44**, and a transmitting member **48** constitute means for fixing the base plate **40** to the protractor **34** and releasing the protractor **34** from the base plate **40**. Scales **52** and **54** are detachably fixed to the scale mounting plate **42** as shown in FIG. **3**. Numeral **56** denotes a bottom portion cover fixed to the base plate **40**, and numeral **58** denotes an upper portion cover mounted on the cover **56**. The support base plate **18**, stationary board **32**, protractor **34**, index ring **36** and tubular member **20** constitute a non-rotating portion of the head. Numeral **60** denotes a rotating member composed of a tubular member fixed to the mounting plate **24**, and teeth **60***a* are provided on a lower portion of the rotating member **60**. The center of rotation of the teeth **60***a* and the center of the spindle **22** are coaxial. Numeral **62** denotes a second rotating member formed of a gear rotatably and pivotally supported at **64** on the support base plate **18**, and the rotating member **62** is meshed with the teeth **60***a*. In FIG. **1**, numeral **66** denotes a guide groove extending lengthwise in a radial direction of the gear **62**, and an element **68** is slidably disposed in the guide groove for movement in a longitudinal direction along the guide groove **66**. Numeral **70** denotes a threaded shaft rotatably and pivotally supported on the rotating member **62**, and a threaded hole in the element **68** is threaded on the shaft **70**. One end of the shaft **70** has a knob **72** thereon. Numeral **74** denotes a cylinder having one end open and fixed to the support base plate **18**, and a disc member **76** is slidable in the cylinder **74**. Numeral **78** denotes a coil spring compressed and disposed in the cylinder **74**, and its one end is elastically contacted with the disc member **76**. Numeral **80** denotes a rope guide in the form of a rope pulley rotatably and pivotally supported on the support base plate **18**, and a wire rope **82** having pliability and flexibility is reeved around the rope guide **80**. One end of the rope **82** is connected to the disc member **76**. The other end of the rope **82** is fixed to a metal terminal **84**, and the metal terminal **84** is connected to a projection on the member **68**. When the terminal **84** is positioned at a rope control point E of the rope guide **80**, an initial zero position of the spring **78** is set so that the tension on the rope **82** from the spring **78** is zero, and also, a spring **78** is employed which has spring constant corresponding to weights of the base plate **40**, scale mounting plate **42** and scales **52** and **54**. The head **16** is so constructed that it will be static at an optional position on the inclined drawing board **2** by a known head balancing device (not shown).

The operation of the embodiment of this invention will be described in the following.

In the first place, the drawing board **2** is set at a desired angle relative to the floor level. When pressure is applied to the handle **26** of the head **16** in an optional direction in parallel to the surface of the drawing board **2**, the head **16** can be parallelly shifted to a desired location on the drawing board **2**. When the index lever **28** is manually shifted in a left direction in a condition where the head **16** is static at an optional position on the drawing board **2**, the conical bar **30** is swung in a counterclockwise rotating direction in FIG. **2** with a bulged portion **30***a* of the bar **30** as its fulcrum and the transmitting member **48** is shifted in the rightward direction. Thus, the swing arm **44** is swung in a clockwise rotating direction in FIG. **3** with the shaft **46** as its center, and its pawl portion **44***a* is separated from the recess **38** of the index ring, and the scale mounting plate **42** becomes freely rotatable around the tubular member **20**. Namely, the fixing of the scale mounting plate **42** relative to the non-rotating member is released. In this condition, a rotatory torque T' is generated on the spindle **42** by the weight of the base plate **40**, scale mounting plate **42** and scales **52** and **54**. This rotatory torque T' is transmitted to the second rotating member **62** by means of the rotating member **60**. The magnitudes of the rotatory torque T' and the rotatory torque T working on the second rotating member **62** are almost identical, and the torques are in opposite directions. Accordingly, the scales **52** and **54** are static on the drawing board **2** even if they are in a free rotating condition, and no rapid rotation due to the weight occurs. When the scale **52** is rotated until it becomes almost parallel upwardly to the vertical rail **8**, namely, to almost +90 degrees, the rotatory torque of the rotating member **60** due to the weight of the scales **52** and **54** becomes zero. The terminal **84** at this time approaches most closely to the rope guide **80**, and the so called radius R of rotation on the rotatory torque generating element of the second rotating member **62** due to the spring **78** becomes zero. When the scale **52** is rotated to almost −90 degrees, the rotatory torque of the rotating member **60** due to the weight of the scales **52** and **54** again becomes zero. The terminal **84** at this time is separated the farthest from the rope guide **80**, and the rope **82** is positioned in line with the rotation center of the shaft **64** of the second rotating member **62**, and the tensile force of the spring **78** becomes the largest. However, this tensile force is supported at the side of the non-rotating member by the shaft **64**, and there is no chance for the tensile force to work on the rotating member **60**.

The operation of adjusting the radius R of the rotation will be described in the following.

When the knob **72** is rotated, the shaft **70** is rotated. By this movement, the member **68** is shifted along the guide groove **66**, and the rope terminal **84** is shifted in its radial direction on the rotating member **62** by being interlocked with the member **68**. The distance of the rope connection point C from the center of the rotation of the rotating member **62** is changed by the shifting of the rope terminal **84**. The value of the load W applied on the base plate **40** by the weight of the scale is changed according to a change of the inclination angle of the drawing board. Accordingly, when the inclination angle of the drawing board **2** is changed, the knob **72** is rotatably adjusted so that the magnitude of the rotatory torque T generated on the rotating member **62** by the tensile force of the spring **78** can be caused to coincide with the magnitude of the rotatory torque T' generated on the rotating member **62** by the load W.

Another embodiment will be described in the following by referring to FIG. 6 and FIG. 7.

Numeral **100** denotes a bracket, and the lower end of a perpendicular portion **100***a* is fixed to a support base plate **104** by a screw **102**. At upper and lower ends of the perpendicular portion **100***a*, vertical rope pulleys **106** and **107** are rotatably journaled. The upper end of the perpendicular portion **100***a* is adjacent to the rope pulley **106**, and a rope guide **110** made of a horizontal rope pulley is rotatably journaled thereon. Numeral **116** denotes a threaded shaft rotatably inserted into a horizontal hole **114** bored in the side wall of a handle **112** (rotating member) in a radial direction, and one end of the screw lever **116** has a knob **118** fixed thereto. One surface of the knob **118** abuts rotatably in a recess portion **120** formed in the handle **112**. Numeral **122** denotes a second rotating member constituted by a frame member, and the shaft **116** is rotatably inserted into holes bored in a pair of side walls of the second rotating member. The rotatory torque of the rotating member **122** is transmitted only to the handle **112** (rotating member) by means of a shaft **116** by this construction. A disc like projection **124** projecting from the bottom wall of the rotating member **122** is fitted rotatably in a hole **126** bored in the horizontal portion of the bracket **100**. The center of the hole **126** is coaxial with the center of the rotation of the handle **112**. The upper end of the rotating member **122** abuts the lower surface of the cap **112***a* of the handle **112**. Numeral **128** denotes an element threaded on shaft **116**, and a shaft **130** is fixed to the lower end of the element **128**, and a terminal **134** of a wire rope **132** is fitted on the shaft **130**. The shaft **116** is so constructed that it does not shift in the axial direction thereof relative to the rotating member **122**. The lower end of the shaft **130** abuts slidably on the upper surface of the horizontal portion of the rotating member **122**, and one side and the upper surface of the element **128** abut slidably on the side of the perpendicular portion of the rotating member **122** and the lower surface of the cap **112***a* of the handle **112**. Numeral **140** denotes a coil spring whose one end portion is secured by a screw to the support base plate **104**, and one end of the flexible wire rope **132** having a flexibility is connected to the other end portion of the coil spring. The wire rope **132** is reeved around the pulleys **108** and **106** and the rope guide **110**, and the terminal **134** is connected to the other end thereof. The internal structure of the head is identical with the internal structure of the head illustrated in FIG. 2 so that the description thereof is omitted. In the foregoing construction, when the center point of the hole of the terminal **134** is closest to the rope control terminal E of the rope guide, the tensile force of the spring **140** is set to be zero. Also, the setting is made when the handle **112** of the head is rotated until the scale **52** becomes almost parallel to the vertical rail **8** (refer to FIG. **1**) in a counterclockwise rotating direction in FIG. **7** on the inclined drawing board, and the rotatory torque T' generated in the handle **112** due to the weight of the scales **52** and **54** is zero, the terminal **134** approaches most closely to the rope guide **106**, and the radius R of rotation of the rotatory torque generating element on the handle **112** due to the spring **140** becomes zero. The rotatory torque T' generated in a clockwise rotating direction in FIG. **7** on the spindle **22** by the weight of the scale and the scale mounting plate is transmitted to the handle **112** (rotating member). On the other hand, the tensile force of the spring **140** is transmitted to the handle **112** by means of the rope **132**, element **128**, and shaft **116**, and the rotatory torque T is generated in a counterclockwise rotating direction in FIG. **7** on the handle **112** by the tensile force of the spring **140**. In the condition where the drawing board is fixed at a predetermined inclination angle, the magnitudes of the rotatory torques T and T' are set identically, and when the scale is in a free condition, it is static on the inclined drawing board, and remains in complete balance. When the inclination angle of the drawing board is changed, the magnitude of the rotatory torque T' is changed. In this case, the knob **118** is rotated, and the element **128** is shifted in the radial direction of the handle **112** along the shaft **116**, and the magnitude of the rotatory torque T' is made to coincide with the magnitude of the rotatory torque T. When the rotating member **112** is rotated until the scale **52** is at almost −90 degrees, and the tensile force of the spring **140** becomes a maximum on the second rotating member **122**, this tensile force is supported by the bracket **100**, and the tensile force of the spring **140** does not work on the rotating member **112**. In the embodiment shown in FIG. **8**, one end **150***a* of the bent spring **150** is rotatably mounted on the support base plate **18**, and the other end **150***b* is rotatably mounted on the element **68** and the tension is so set that the elastic force becomes zero when both the end portions **150***a* and **150***b* are superposed. Also, as shown in FIG. **9** through FIG. **11**, a cylinder **152** is rotatably journaled at **154** on the support base plate **18**, and the tip of a rod **158** urged by a coil spring **156** is rotatably connected to the element **68** and the second rotating member **62** is urged in a counterclockwise direction in FIG. **9** by the tensile force on the rod **158**. In this construction, when the tip of the rod **158** is shifted to the center of rotation of the cylinder **152**, the initial elastic force of the spring **156** is set so that the elastic force of the coil spring **156** becomes zero.

In the embodiment of the scale balancing device as shown in FIG. **12** and FIG. **13**, pulley portions for a timing belt are formed on the second rotating member **160** and the first rotating member **162**, and the portion between the pulley portions may be connected by an endless timing belt **164**. Instead of the timing belt, ordinary belts may be used. The second rotating member **160** is rotatably journaled at **168** on the support base plate **166**, and the rotating member **162** is fixed to a cylinder **172** fixed to a mounting plate **170**by means of screws. An element **176** is threaded on a threaded shaft **174** rotatably journaled on the rotating member **160**, and when the shaft **174** is rotated, the element **176** is shifted along the shaft **174**. A projection **178** is rotatably fitted on the element **176**, and metal terminal **180***a* of a rope **180** is fitted on the projection **178**. Numeral **182** denotes a bracket fixed to the support base plate **166** by screw **182***a*, and one end of a coil spring **184** is engaged with the screw and the other end of the coil spring **184** is connected to one end of the wire rope **180**. The other end of the wire rope **180** is connected to the element **176** by means of the metal terminal **180***a*. Numeral **186** denotes a rope guide constituted by a pulley mounted rotatably on the support base plate **166**, and numeral **188** denotes a belt guide pulley mounted rotatably on the bracket **182**. The internal construction of the head of this embodiment is almost identical with the construction of the head illustrated in FIG. **2** so that the description there of is omitted.

In the foregoing construction, the rotatary torque generated in the counterclockwise rotating direction in FIG. **13** on the rotating member **162** by the weight of the scale is transmitted to the second rotating member **160** by means of the timing belt **164**, and this rotatory torque is canceled out by the rotatory torque due to the tensile force of the spring **184**. A maximum tensile force of the spring **184** is supported by the fulcrum **168** of the second rotating member **160**, and is not transmitted to the rotating member **162**. An adjustment of the torque on the second rotating member **160** can be carried out by rotating the shaft **174** and shiftably adjusting the element **176** in the radial direction of the rotating member **160**.

In FIG. **14** through FIG. **16**, an embodiment of the invention is disclosed in which the point of engagement of the second rotating member and the rotating member is set in the vicinity of the point of center of gravity at the side of the first rotating member. In FIG. **14** and FIG. **15**, numeral **122***a* denotes an arm projecting from the second rotating member **122**, and one side of the tip of the arm **122***a* abuts on the handle **112** (rotating member) when the scale **52** is in parallel condition with the horizontal rail **4**, and in FIG. **14**, it abuts and engages on a surface **190***a* of a concave recess **190** formed at the right side of the handle **112** and parallel with horizontal rail **4**, namely, toward the center of gravity at the side of the rotating member as discussed in connection with FIGS. **17***a*–**17***c*. The abutted portion of the surface **190***a* and one side of the arm **122***a* forms an engaging point of the rotating members **112** and **122**. The hole **114** formed in the handle **112** is larger in diameter than the hole of the embodiment illustrated in FIG. **7**, and a gap is formed between the hole **114** and the shaft **116**. The construction of other portions is identical with the construction illustrated in FIG. **7**. In FIG. **16**, numeral **192** denotes a belt pulley mounted rotatably on the bracket **182**, and in FIG. **16**, one end K of the timing belt **164** is guided so as to leave the rotating member **162** at right side in FIG. **16** of the rotating member **162**, i.e. the point at which the scale **52** is almost in a horizontal position parallel the horizontal rail **4**, namely, toward the point of center of gravity at the side of the rotating member **162** as discussed in connection with FIGS. **17***a*–**17***c*. The end K is the effective point where the rotating members **160** and **162** are engaged. The construction of other portions is identical with the structure of the head illustrated in FIG. **12** and FIG. **13**.

What is claimed is:

1. A scale balancing device for balancing the weight of a scale of a universal parallel ruler, said device comprising a head structure having a rotating scale support rotatably mounted thereon on which said scales are carried, said scale support and scales having a center of gravity when the scale is horizontal spaced horizontally from the axis of rotation of said scale support, a rotating member rotatably mounted on said head structure separate from said rotating support, means rotatably interlocking said rotating member and said scale support, an eccentric member on said rotating member, a spring member having one end connected to said eccentric member and the other end connected to said head structure and tensioned for providing a torque on said rotating member in a direction which substantially cancels out the torque on said rotating member from the weight of the scales, the point of interlocking of said rotating member and said scale support being on the side of said scale support toward the center of gravity when the scale is in the horizontal position for causing the point of action of the torque from said rotating member to act upwardly at a point toward the center of gravity from the axis of rotation of said scale support.

2. A scale balancing device as claimed in claim **1** in which said rotating member is spaced laterally of said scale support and said device further comprises a belt means connected between said rotating member and said scale support, said belt means extending away from the periphery of said scale support in a vertically upward direction on the side toward the position of said scale when said scale is in the horizontal position.

3. A scale balancing device as claimed in claim **2** in which said rotating member is coaxial with said scale support, and has an arm projecting therefrom toward the position of the center of gravity when the scale is in the horizontal position, the end of said arm engaging said scale support.

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